

25X1A

Approved For Release 20

4 October 1960
Ref. No. 8/77/60

25X1A

in re
13 Oct 60

25X1A

Dear [REDACTED]

Under separate cover you will receive 40 copies of a publication entitled "Image Enhancement Program". This covers my talk of August 30th, before the Joint Chiefs Committee.

Enclosed are eight copies of a summary of the document for your report.

25X1A

AJH:cs

Declass Review, NIMA/DoD

Summary of Image Enhancement Program

The process of surveillance and photographic interpretation is fundamentally one of communication. The information or message, consists of the shape, size, texture, and interrelationships of the objects that have been photographed. The "channel" or transmission medium is provided by the selective reflection of light from the objects, their transmission to the camera and to the photographic emulsion upon which they are recorded. The received message is, of course, the processed emulsion, suitably printed or otherwise displayed. There are many types of "noise" or disturbances which render this communication system non-ideal. Light values vary greatly over the scene being recorded, and the photographic process cannot be optimized for all of them. Frequently the objects of interest are of a contrast ratio and size such that the photographic process is strained to its limiting resolution. Intervening haze or atmospheric turbulence may disturb the scene itself even before it reaches the camera. All of these disturbances make the process of photographic interpretation a very difficult one indeed.

A most remarkable feature of this communication system is that frequently there is information recorded on the photographic emulsion which the interpreter is unable to ascertain. It is the retrieval of this information that forms the subject of the program. The detection of useful information which is recorded on a photograph, but is otherwise undiscernable, and its presentation to the photographic interpreter, are parts of the image enhancement

-2-

ment process. Presented here is a technical discussion of the underlying principles of image enhancement together with a concrete example of means of means for implementing them. The scope of the techniques that may be brought to bear on image enhancement is vastly greater than that which has been applied to date.

25X1A

The [redacted] is proceeding toward a development of an image enhancement instrument in the following steps:

1. Detailed Study
2. Design and Construction of Feasibility Model
3. Design and Construction of Operational Instrument

The techniques to be embodied in the instrument include area scan filtering, electrical frequency filtering, non-linear signal processing, automatic gain (contrast) control, automatic brightness control and a line drawing function.